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Measurement of Students' Performance Level in a Group Project by using Peer Review and Lecturer Assessment

Nor Kamaliana Khamis[a,b,*] and Abu Bakar Sulong[a,b]

[a] *Centre for Engineering Education Research, Faculty of Engineering and Built Environment, Universiti Kebangsaan Malaysia*
[b] *Department of Mechanical and Materials Engineering, Faculty of Engineering and Built Environment, Universiti Kebangsaan Malaysia*

Abstract

Group projects can help students develop certain generic skills sought by employers. The current paper presents the results of the peer reviews and lecturer assessments for KF1121: Professionalism in Engineering and Built Environment I. This course involved 66 first year students from the Department of Mechanical and Materials Engineering for the 2010/2011 sessions. The aforementioned tools were used to measure the performance of each student. The current study aims to determine an individual's weaknesses and strengths in a group and relate it with the group performance based on the individual presentation mark. It also studies the relationship between these two tools. The findings show that peer review and lecturer assessment can be used as tools for determining the performance of students in a team and that the relationship between these two tools are small.

Keywords: Peer review; lecturer assessment; correlation; presentation; performance

1. Introduction

Given the high demand from industries and students, a number of institutes of higher learning (IHLs) in Malaysia have been offering an increasing number of various courses. Currently, Malaysia has 20 registered public IHLs and more than 400 registered private IHLs (MOHE 2011). Based on a recent survey, most employers are interested in employees who have personal values, intellectual and communication skills, good working attitude, and knowledge that spells success (Muhamad et al. 2008; Warn and Tranter 2001; Coopers and Lybrand 1998). Previous studies also show that all these skills can be developed via integrated learning and teamwork (Ballantine & Larres 2007; Mahenthiran & Rouse 2000). Thus, enhancing one's personal development and knowledge is truly important (Lees 2002).

Muhammad et al. (2008) and Mahenthiran and Rouse (2000) developed a peer assessment method for evaluating the attitudes and performances of students while working in groups. Massingham et al. (2011) stated that this method gathers information from different sources. Thus, it is known as the 360-degree feedback. In addition, Muhammad et al. (2008) and Dyrud (2001) reported the effectiveness of this method in assessing students'

* Corresponding author. Tel.: +6-03-8921-6967; fax:+6- 03-8925-9659.
E-mail address: kam@eng.ukm.my.

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involvement in a group. However, the information gathered may not be absolutely accurate. Similar scores and bias toward group members or individuals are examples of the issues highlighted by Dyrud (2001). Lecturer assessment may help solve this problem as the involvement of more parties in the evaluation process can influence the individual performance scores (Massingham et al. 2011). This method has also been adopted by academicians and practitioners. Therefore, the current study considers these two types of assessment to identify the weaknesses and strengths of individuals within a group. In addition, the relationship between the two methods is explored.

2. Assessment Method

A total of 66 first year students from 13 groups for the Department of Mechanical and Materials Engineering 2010/2011 sessions were involved in the current study. Generally, each group had five or six members of various races and genders. Each student evaluated the group members' performance after the presentation session. A Likert scale was used in the evaluation form with "5" indicating "strongly agree" and "1" for "strongly disagree." The criteria for peer review include an assessment of P08 (ability to function effectively as individuals with leadership or managerial capacities and as groups). The criteria for peer assessment are as follows:

P1. Ability to negotiate among members and respect other opinions as well as stimulate a discussion to achieve the desired result;
P2. Ability to work in a team to achieve the same objectives (builds a good relationship, interacts, and works effectively with other members);
P3. Ability to respect the opinions, position, and beliefs of others (tolerant);
P4. Ability to contribute to the planning and coordination of the efforts of the group;
P5. Ability to perform responsibilities with integrity and trust (does not cheat during the preparation of the paper);
P6. Ability to improve based on the comments received;
P7. Ability to manage time and meet the due date;
P8. Ability to show tolerance for cultural diversity.

For the lecturer assessment, marks were given during the individual's presentation for the group project. The criteria for evaluation are based on P07 (communication skill with engineers and society). This assessment has six criteria: K1) posture and interaction points, K2) speaking guide, K3) order, K4) visual aids, K5) knowledge level of the subject, and K6) reaction to the question (style). Moreover, it was used by the lecturers to evaluate each student directly when they presented their projects. Five ratings were used for this assessment: 5 for "excellent," 4 for "good," 3 for "satisfactory," 2 for "not adequate," and 1 for "not enough." Each rating has its own explanations per criterion.

3. Result and Discussion

3.1. Performance Measurement

The performances of students in a group were compared using Microsoft Excel based on the overall presentation score and peer review. In the current project, 40% was allocated for the presentation and 10% for the peer review. Moreover, 40% and 10% were the corresponding maximum percentages for these two tools, respectively. Figure 1 shows the score levels for the students based on these two types of assessments are almost the same.

In Figure 1, the peer review and lecturer assessment methods have four score ranges, which are categorized based on the pattern of the individual score. According to the results, 42 students obtained excellent and good scores for both assessments, whereas 4 obtained fair and poor scores. However, these results still do not explain the actual relationship between both assessments in determining student performance. Therefore, in the next section, the relationship between these two variables was investigated.

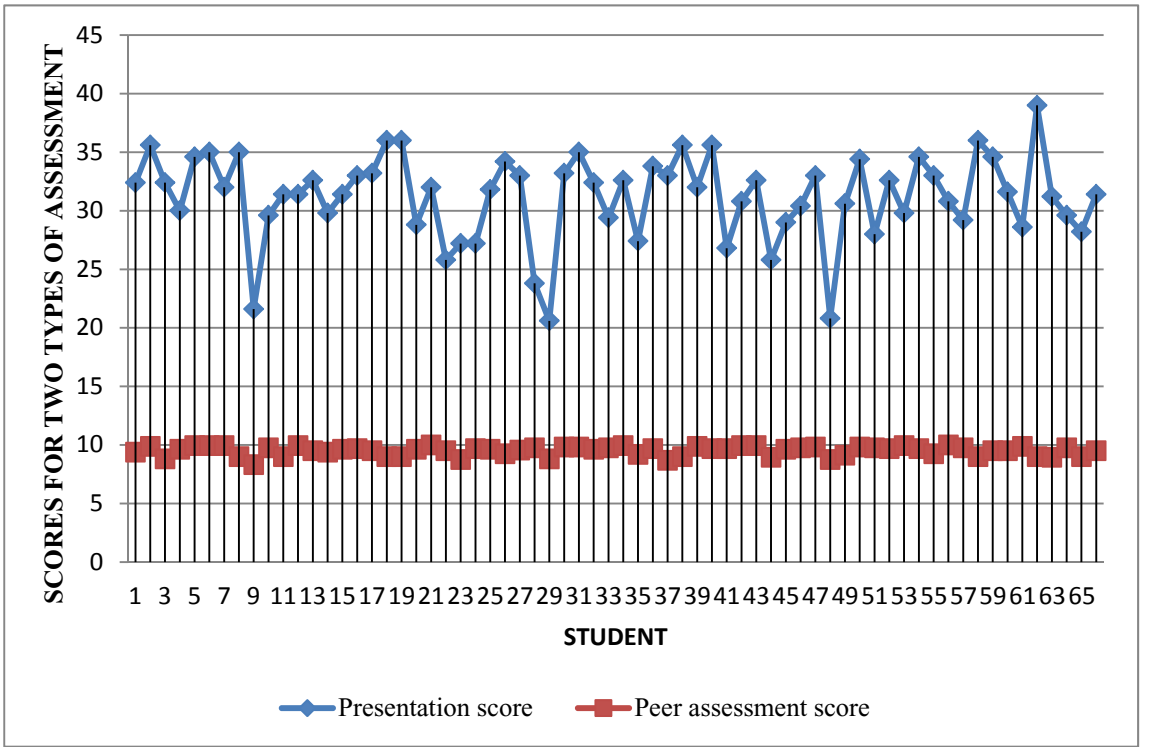

Figure 1. Presentation score and peer assessment score for 66 students

In order to get a rough picture about this figure, there are four ranges of score for the peer review and the lecturer assessment that had been categorized based on the pattern of the individual score as listed in Table 1.

Table 1. Range of score category

Range of score for lecturer assessment	Range of score for peer review	Level
40-35	10-9.5	Excellent
34.9-30	9.49-9	Good
29.9-25	8.99-8.5	Fair
24.9 and below	8.49 and below	Poor

Results demonstrate that students who obtained excellent and good scores for both assessments are 42, while students with fair and poor scores are 4. However, this statement still did not show the actual relationship between both assessments in determining students' performance. Therefore, in the next section, the relationship between these two variables were conducted.

3.2. Correlation

An SPSS software program was used to study the correlation between peer review and lecturer assessment using four items.

3.2.1 Relationship between the peer review and the overall presentation score

The Pearson correlation coefficient between the peer review score and the presentation score is +0.219. Although this coefficient is positive, its value is less than +0.30, indicating small correlation between these two variables.

3.3. Relationship between the peer review score and lecturer assessment score for mixed criteria K5 and K6

Criteria K5 and K6 emphasize the advantage of individuals in handling the project. It is measured based on the level of individual knowledge about the project and the individual responses during the question and answer session. The Pearson correlation coefficient is positive (+0.285). However, the relationship is small.

3.4. Pearson correlation between the peer review score and the lecturer assessment score for criterion K5

The relationship between the peer review score and the lecturer assessment score for criterion K5 was explored because this criterion demonstrates a student's knowledge of the project. Based on previous studies, students who have a strong knowledge base will excel more in academics and discussion activities (Strangman & Hall 2009; Canada & Reddington 2006). The correlation between the peer review score and the lecturer assessment score for criterion K5 was investigated using the Pearson product-moment correlation coefficient, and a small positive correlation between the peer review and lecturer assessment ($r = 0.251$, $n = 66$, $p < 0.05$) was observed.

3.5 Pearson correlation between score of peer review and lecturer assessment for criterion K6

The relationship between the peer review and the lecturer assessment score criterion K6 was studied because this criterion requires students to answer questions spontaneously. In addition, it also tests the actual knowledge of students on their project. A medium positive correlation between the scores of the peer review and lecturer assessment for criterion K6 ($r = 0.341$, $n = 66$, $p < 0.05$) was observed.

4. Conclusion

The strengths and weaknesses of group members can be determined through the peer review and lecturer assessment from presentation sessions. These assessments also help detect any passive students in a group project. In the current paper, the relationship between both variables (peer review and lecturer assessment) was identified. The results show a weak relationship between both variables, which may be due to the different perspectives and opinions of the different evaluators. For the peer review, sometimes, students tend to give almost the same score to his/her group members, whereas for the lecturer assessment, the lecturers cannot detect the students' behaviors directly based on their presentations. Moreover, the latter detects only the students' knowledge and confidence through their communication with the lecturers. Nevertheless, good communication is very important in the group activities.

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